

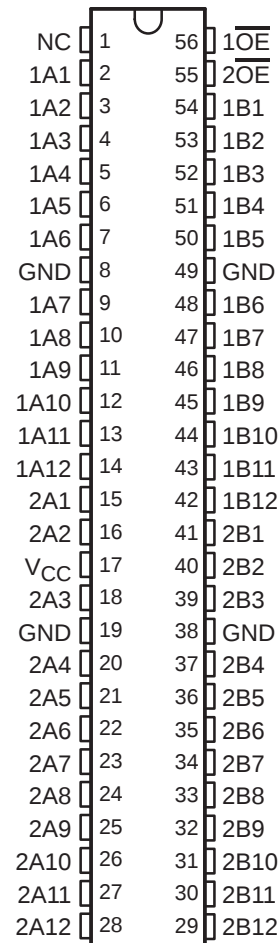
- Member of the Texas Instruments Widebus™ Family
- 5-Ω Switch Connection Between Two Ports
- TTL-Compatible Input Levels

description/ordering information

The SN74CBT16211A provides 24 bits of high-speed TTL-compatible bus switching. The low on-state resistance of the switch allows connections to be made with minimal propagation delay.

The device operates as a dual 12-bit bus switch or single 24-bit bus switch. When $\overline{1OE}$ is low, 1A is connected to 1B. When $\overline{2OE}$ is low, 2A is connected to 2B.

DGG, DGV, OR DL PACKAGE (TOP VIEW)



NC – No internal connection

ORDERING INFORMATION

T _A	PACKAGE [†]		ORDERABLE PART NUMBER	TOP-SIDE MARKING
–40°C to 85°C	SSOP – DL	Tube	SN74CBT16211ADL	CBT16211A
		Tape and reel	SN74CBT16211ADLR	
	TSSOP – DGG	Tape and reel	SN74CBT16211ADGGR	CBT16211A
	TVSOP – DGV	Tape and reel	SN74CBT16211ADGVR	CY211A
	VFBGA – GQL	Tape and reel	SN74CBT16211AGQLR	CY211A
	VFBGA – ZQL (Pb-free)		SN74CBT16211AZQLR	

[†] Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.



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PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

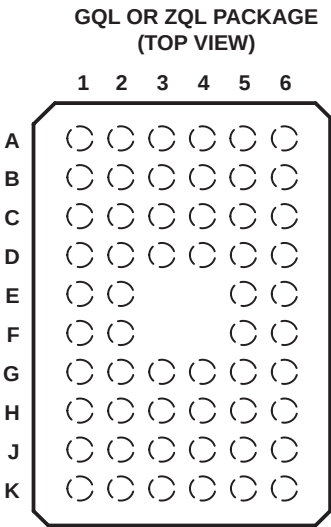


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SN74CBT16211A 24-BIT FET BUS SWITCH

SCDS028M – JULY 1995 – REVISED SEPTEMBER 2003



terminal assignments

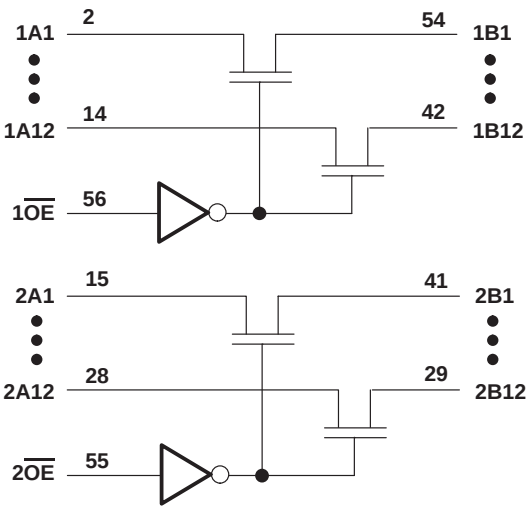
	1	2	3	4	5	6
A	1A2	1A1	NC	1OE	2OE	1B1
B	1A5	1A4	1A3	1B2	1B3	1B4
C	1A7	GND	1A6	1B5	GND	1B6
D	1A10	1A8	1A9	1B8	1B7	1B9
E	1A12	1A11			1B10	1B11
F	2A1	2A2			2B1	1B12
G	VCC	GND	2A3	2B3	GND	2B2
H	2A4	2A5	2A6	2B6	2B5	2B4
J	2A7	2A8	2A9	2B9	2B8	2B7
K	2A10	2A11	2A12	2B12	2B11	2B10

NC – No internal connection

FUNCTION TABLE
(each 12-bit bus switch)

INPUTS		INPUTS/OUTPUTS	
1OE	2OE	1A, 1B	2A, 2B
L	L	1A = 1B	2A = 2B
L	H	1A = 1B	Z
H	L	Z	2A = 2B
H	H	Z	Z

logic diagram (positive logic)



Pin numbers shown are for the DGG, DGV, and DL packages.

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SN74CBT16211A 24-BIT FET BUS SWITCH

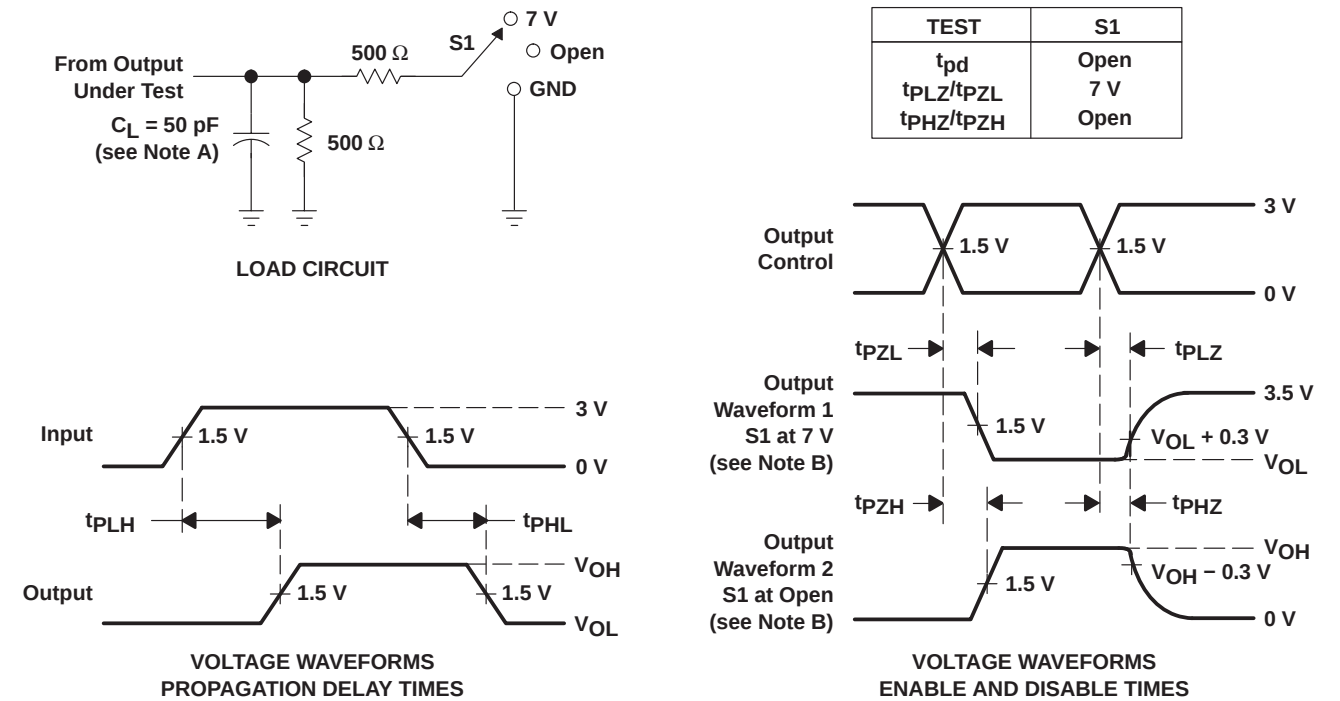
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switching characteristics over recommended operating free-air temperature range, C_L = 50 pF (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC} = 4 V		V _{CC} = 5 V ± 0.5 V		UNIT
			MIN	MAX	MIN	MAX	
t _{pd} [†]	A or B	B or A	0.35		0.25		ns
t _{en}	$\overline{OE}$	A or B	9.3		3.3	8.6	ns
t _{dis}	$\overline{OE}$	A or B	7.1		2.8	7.9	ns

[†] The propagation delay is the calculated RC time constant of the typical on-state resistance of the switch and the specified load capacitance, when driven by an ideal voltage source (zero output impedance).

PARAMETER MEASUREMENT INFORMATION



- NOTES:
- A. C_L includes probe and jig capacitance.
 - B. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.
 - C. All input pulses are supplied by generators having the following characteristics: PRR ≤ 10 MHz, Z_O = 50 Ω, t_r ≤ 2.5 ns, t_f ≤ 2.5 ns.
 - D. The outputs are measured one at a time with one transition per measurement.
 - E. t_{PLZ} and t_{PHZ} are the same as t_{dis}.
 - F. t_{PZL} and t_{PZH} are the same as t_{en}.
 - G. t_{PLH} and t_{PHL} are the same as t_{pd}.
 - H. All parameters and waveforms are not applicable to all devices.

Figure 1. Load Circuit and Voltage Waveforms

PACKAGING INFORMATION

Orderable part number	Status (1)	Material type (2)	Package Pins	Package qty Carrier	RoHS (3)	Lead finish/ Ball material (4)	MSL rating/ Peak reflow (5)	Op temp (°C)	Part marking (6)
SN74CBT16211ADGGR	Obsolete	Production	TSSOP (DGG) 56	-	-	Call TI	Call TI	-40 to 85	CBT16211A
SN74CBT16211ADGVR	NRND	Production	TVSOP (DGV) 56	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	CY211A
SN74CBT16211ADGVR.A	NRND	Production	TVSOP (DGV) 56	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	CY211A
SN74CBT16211ADL	NRND	Production	SSOP (DL) 56	20 TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	CBT16211A
SN74CBT16211ADL.A	NRND	Production	SSOP (DL) 56	20 TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	CBT16211A
SN74CBT16211ADLR	NRND	Production	SSOP (DL) 56	1000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	CBT16211A
SN74CBT16211ADLR.A	NRND	Production	SSOP (DL) 56	1000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	CBT16211A

⁽¹⁾ **Status:** For more details on status, see our [product life cycle](#).

⁽²⁾ **Material type:** When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, reliability performance testing, and/or process qualification, may not yet be complete, and this item is subject to further changes or possible discontinuation. If available for ordering, purchases will be subject to an additional waiver at checkout, and are intended for early internal evaluation purposes only. These items are sold without warranties of any kind.

⁽³⁾ **RoHS values:** Yes, No, RoHS Exempt. See the [TI RoHS Statement](#) for additional information and value definition.

⁽⁴⁾ **Lead finish/Ball material:** Parts may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

⁽⁵⁾ **MSL rating/Peak reflow:** The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

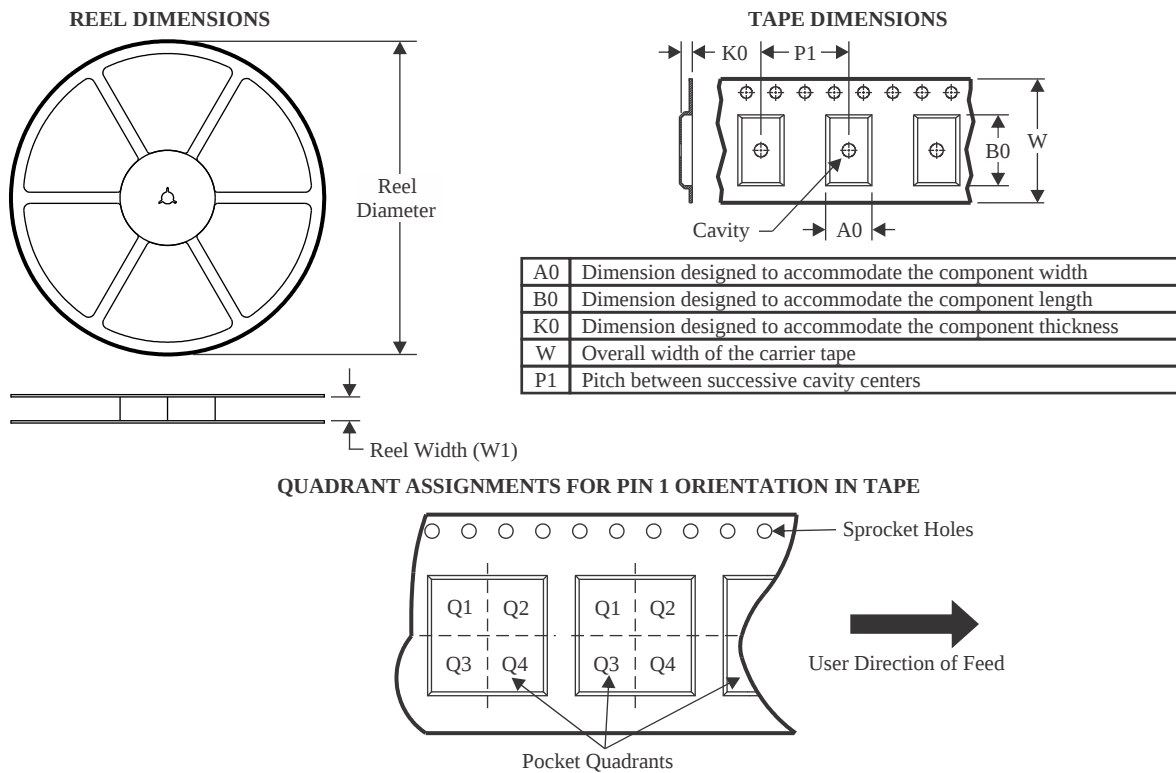
⁽⁶⁾ **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "-" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

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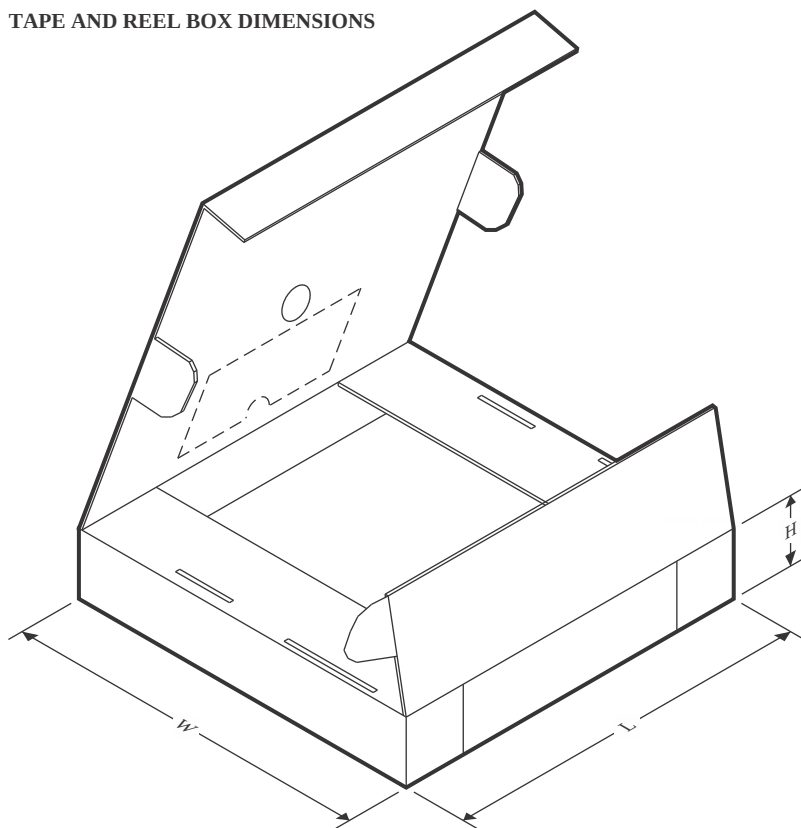
TAPE AND REEL INFORMATION



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SN74CBT16211ADGVR	TVSOP	DGV	56	2000	330.0	24.4	6.8	11.7	1.6	12.0	24.0	Q1
SN74CBT16211ADLR	SSOP	DL	56	1000	330.0	32.4	11.35	18.67	3.1	16.0	32.0	Q1

TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74CBT16211ADGVR	TVSOP	DGV	56	2000	356.0	356.0	45.0
SN74CBT16211ADLR	SSOP	DL	56	1000	356.0	356.0	53.0

TUBE



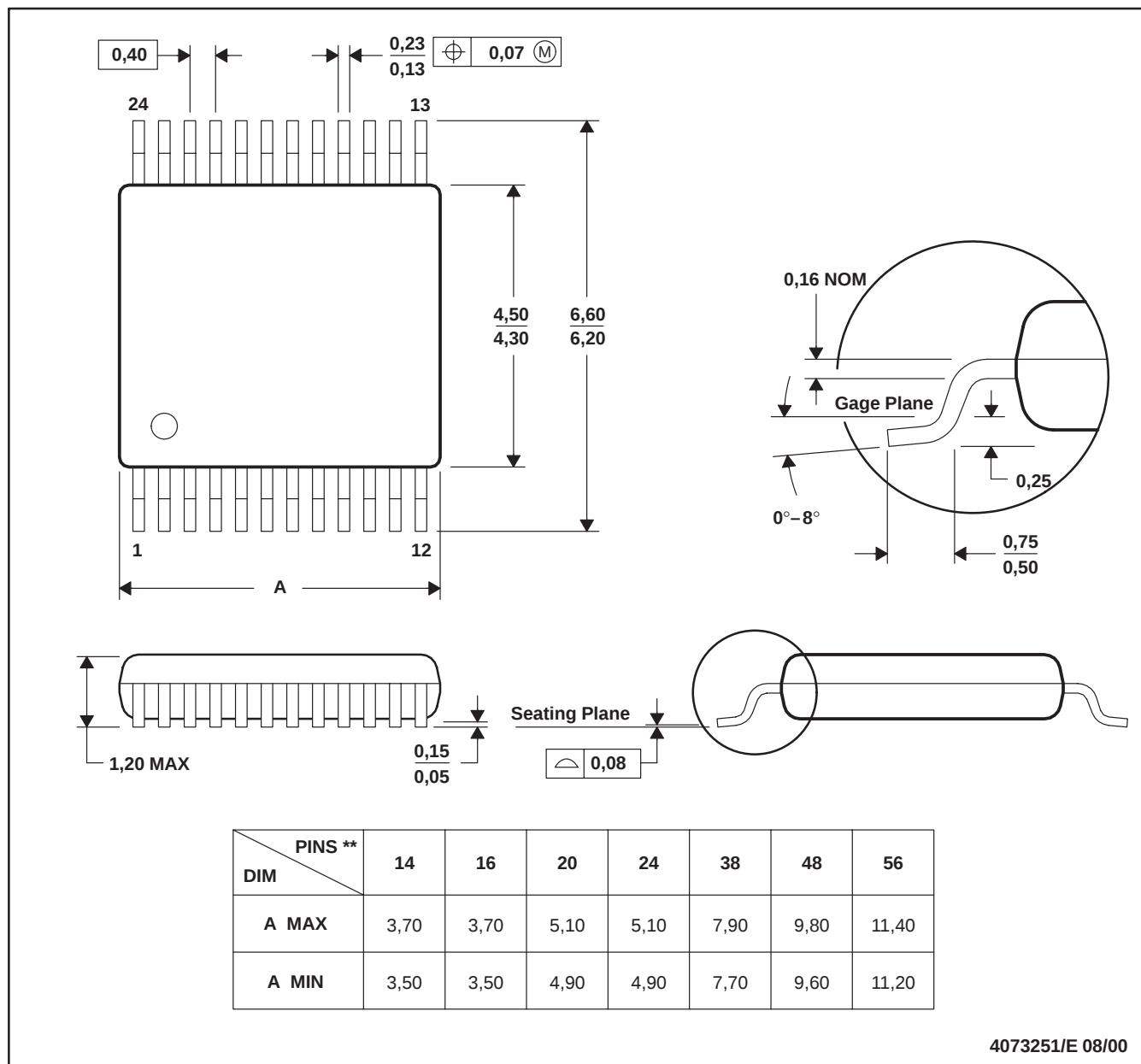
*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (μm)	B (mm)
SN74CBT16211ADL	DL	SSOP	56	20	473.7	14.24	5110	7.87
SN74CBT16211ADL.A	DL	SSOP	56	20	473.7	14.24	5110	7.87

DGV (R-PDSO-G**)

PLASTIC SMALL-OUTLINE

24 PINS SHOWN



- NOTES: A. All linear dimensions are in millimeters.
 B. This drawing is subject to change without notice.
 C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15 per side.
 D. Falls within JEDEC: 24/48 Pins – MO-153
 14/16/20/56 Pins – MO-194



1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 mm per side.
4. This dimension does not include interlead flash. Interlead flash shall not exceed 0.25 mm per side.
5. Reference JEDEC registration MO-194.

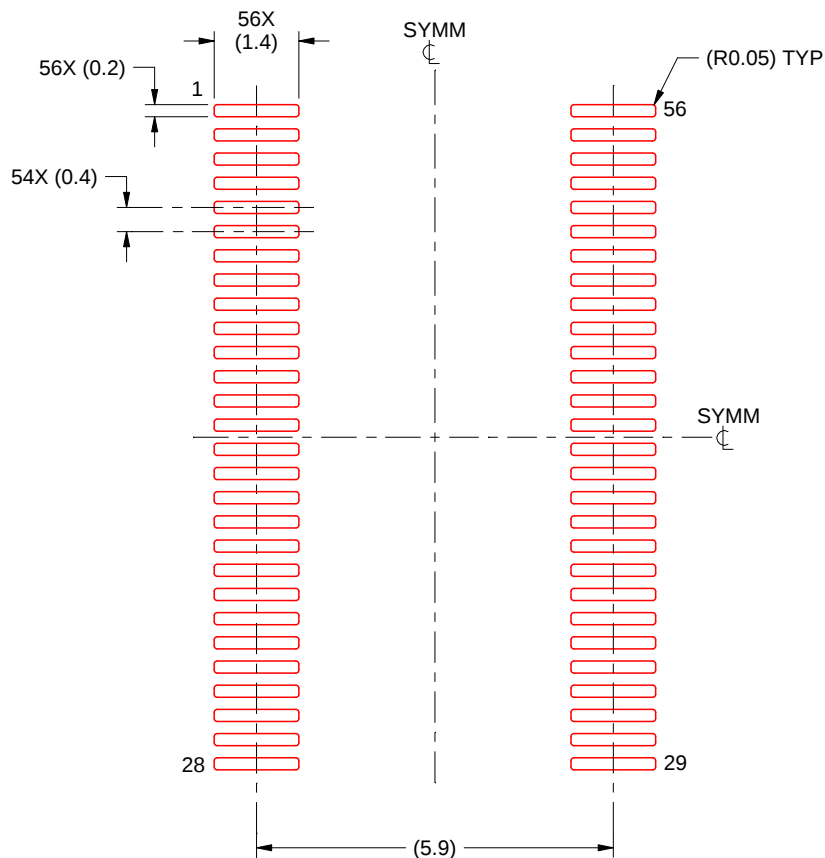
SMALL OUTLINE PACKAGE

EXAMPLE STENCIL DESIGN

DGV0056A

TVSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE: 8X

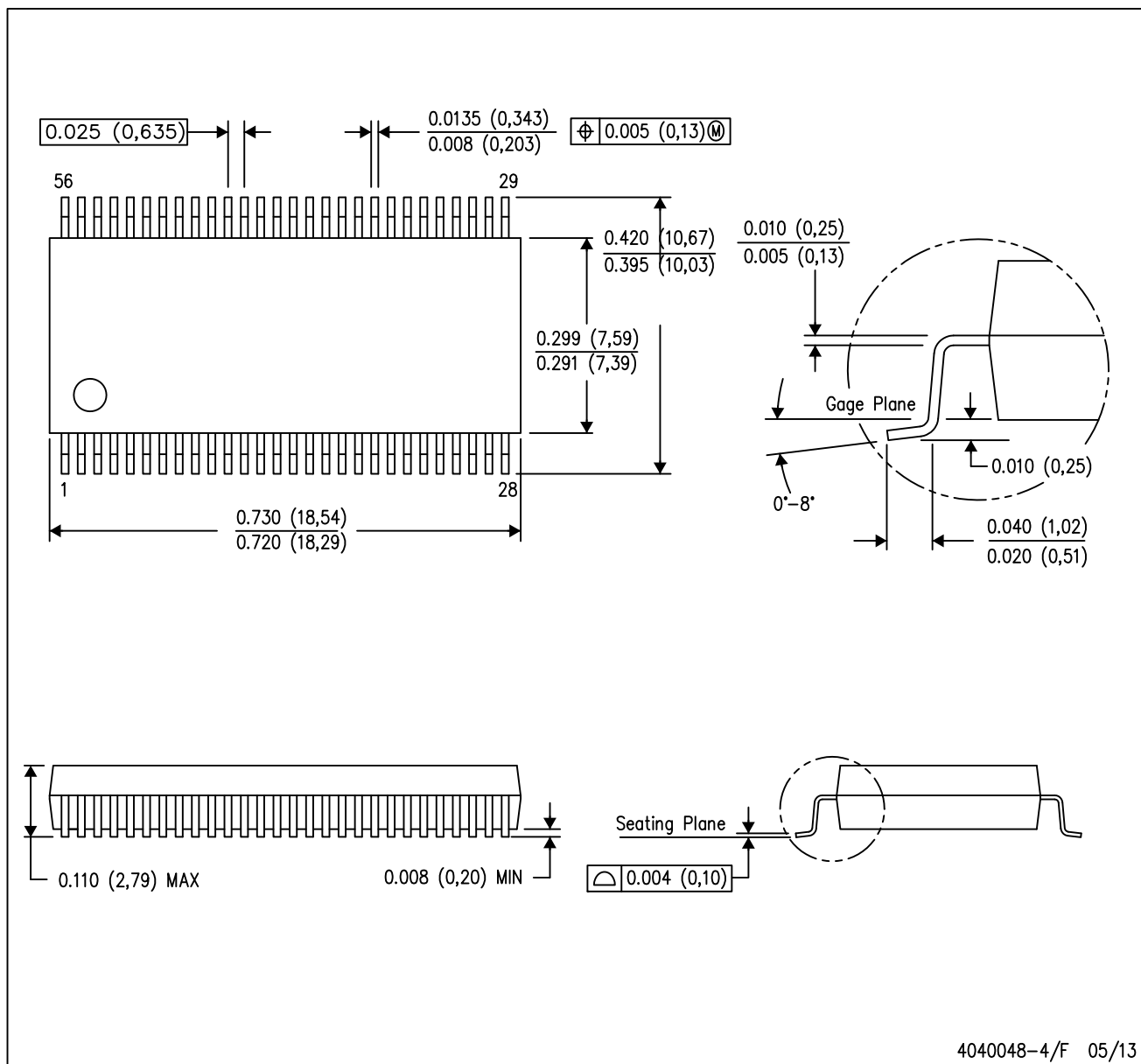
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NOTES: (continued)

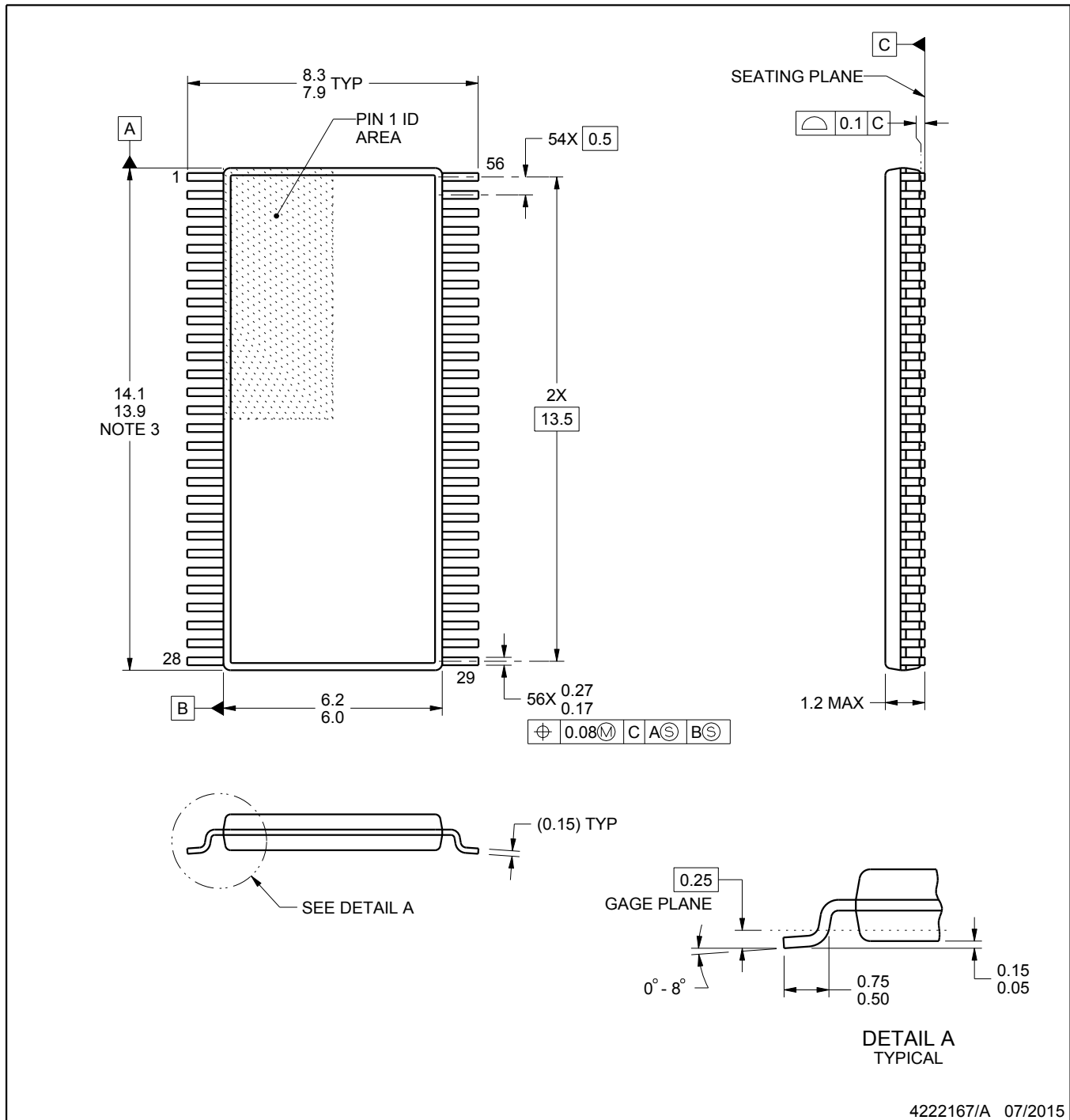
8. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
9. Board assembly site may have different recommendations for stencil design.

DL (R-PDSO-G56)

PLASTIC SMALL-OUTLINE PACKAGE



- NOTES:
- All linear dimensions are in inches (millimeters).
 - This drawing is subject to change without notice.
 - Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0,15).
 - Falls within JEDEC MO-118



NOTES:

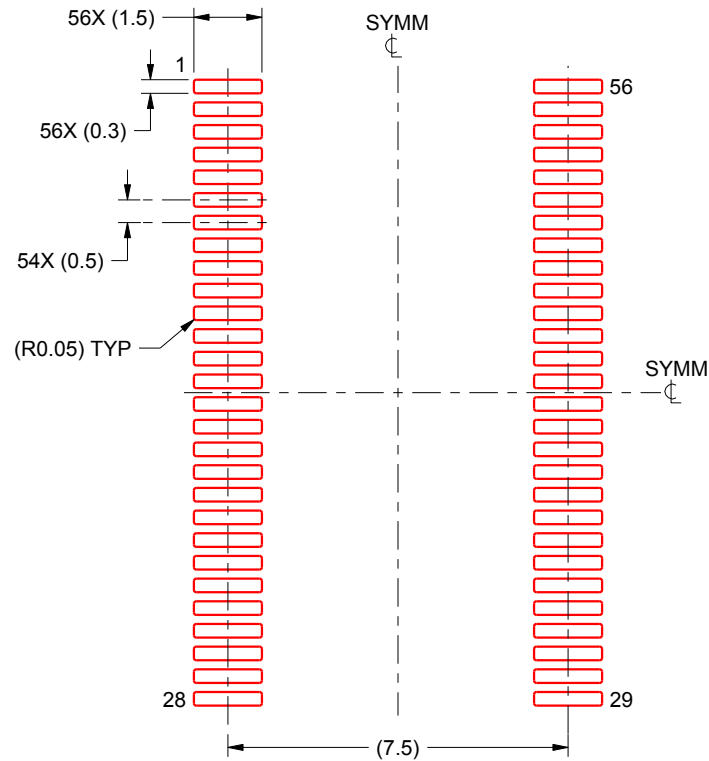
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 mm per side.
4. Reference JEDEC registration MO-153.

EXAMPLE STENCIL DESIGN

DGG0056A

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE:6X

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NOTES: (continued)

7. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
8. Board assembly site may have different recommendations for stencil design.

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